

G

RACER Cleanup Option Cost Estimates

APPENDIX G

The cost estimates included in this appendix were created by utilizing cost estimating software called Remedial Action Cost Engineering and Requirements (RACER®). RACER® is a Windows-based cost estimating computer program that was originally developed for the United States Air Force in 1992 and has since grown to meet the needs of various federal agencies and departments, including United States Army Corp of Engineers and United States Environmental Protection Agency.

When creating an estimate in RACER®, site-specific parameters are added to generic engineering solutions to reflect project-specific conditions and requirements. The software includes numerous pre-defined remedies (referred to as “technologies”), allowing flexibility in selecting a presumptive remedy for a given site. After selecting a remedy, RACER® prompts the user to enter quantities of key input parameters, whether actual or estimated. For example, for a soil excavation and disposal estimate, input entries include contamination area and depth, soil type, analytical testing requirements, waste type (hazardous or non-hazardous), and distance to disposal facility. After entering these site-specific parameters, RACER® automatically calculates resulting volumes along with associated excavation, testing, and disposal costs. These costs are generated using pre-defined assemblies for the selected remedy that use cost data from the RACER® cost database, based primarily on the current Unit Price Book (UPB).

The RACER® database also includes a number of specialized assemblies that are not derived from the Unit Price Book. Costs for assemblies in the RACER® database are updated annually. For those technologies not included in the RACER® database (e.g., sediment dredging and capping), user-defined technologies and associated cost assemblies were developed and added to the database. For these technologies, current cost data were obtained from sources including contractors, vendors, previous experience, engineering judgment, and the 2008 RSMeans Heavy Construction Cost Data reference publication.

Site WBS Report (with Markups)

System:

RACER Version: 10.0.2
Database Location: R:\RACER Cost Estimates\RACER Cost Estimates.mdb

Folder:

Folder Name: Washington

Region:

Region ID: NA
Region Name: Bremerton Gasworks
Region Category: Northwest

Location

State / Country: WASHINGTON
City: WASHINGTON STATE AVERAGE

<u>Location Modifier</u>	<u>Default</u>	<u>User</u>
	1.021	1.021

Options

Database: Modified System
Cost Database Date: 2008
Report Option: Calendar

Description Cost estimates for Bremerton Gasworks

Site WBS Report (with Markups)

Site:

Site ID: NA
Site Name: Option 1 - Hot Spot Excavation; GW Mon Wells
Site Type: Multi - Soil & GW

Media/Waste Type

Primary: Soil
Secondary: Groundwater

Contaminant

Primary: Fuels
Secondary: None

Phase Names

Pre-Study: ☐
Study: ☐
Design: ☐
Removal/Interim Action: ☐
Remedial Action: ☒
Operations & Maintenance: ☐
Long Term Monitoring: ☐
Site Closeout: ☐

Documentation

Description: Cost estimate for Option 1 - Hot Spot Excavation and Installation of Monitoring Wells.

Assume installation of 4 monitoring wells and one year of groundwater monitoring. Longterm monitoring not included.
Assume average GW depth: 25' bgs.

Assume 2 upland soil hot spots requiring excavation and offsite disposal:
Hot Spot 1 near sample location SP03. Assume 25'x25' to 10' bgs.
Hot Spot 2 near sample location MP03. Assume 25'x25' to 15' bgs.
Resulting total excavation volume = approx. 600 cubic yards (average depth 12.5' bgs).
Assume soil type: sand/gravelly sand mixture.
Assume offsite disposal as hazardous waste.

Support Team: E&E

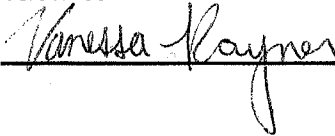
References: None

Estimator Information

Estimator Name: Vanessa Rayner
Estimator Title: Civil Engineer
Agency/Org./Office: Ecology & Environment, Inc.
Business Address: 720 Third Ave., Suite 1700
Seattle, WA 98104
Telephone Number: 206-624-9537

Site WBS Report (with Markups)

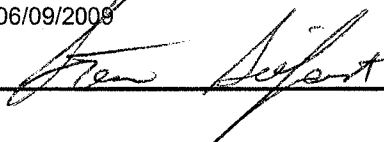
Email Address: vrayner@ene.com
Estimate Prepared Date: 06/09/2009

Estimator Signature: 

Date: 6/9/09

Reviewer Information

Reviewer Name: Steve Siefert
Reviewer Title: Senior Chemical Engineer
Agency/Org./Office: Ecology & Environment, Inc.
Business Address: 720 Third Ave., Suite 1700
Seattle, WA 98104
Telephone Number: 206-624-9537
Email Address: ssiefert@ene.com
Date Reviewed: 06/09/2009

Reviewer Signature: 

Date: 6-9-09

Site WBS Report (with Markups)

Phase:

Phase Type: Remedial Action
Phase Name: Monitoring Well Installation
Description: Assume 4 monitoring wells. 2" diameter PVC Schedule 80 .
Assume average GW depth: 25' bgs.
Assume well depth of 45'.
Assume split spoon sample collection every 5' with analysis (fuels).
Costs for well installation and one year of groundwater monitoring. Longterm monitoring not included.

Approach: None
Start Date: August, 2009
Labor Rate Group: Marked Up Labor Rates_E&E
Analysis Rate Group: System Analysis Rate
Phase Markups: Markups_E&E

Technology Markups

Groundwater Monitoring Well
MONITORING

<u>Markup</u>	<u>% Prime</u>	<u>% Sub.</u>
Yes	100	0
Yes	100	0

Site WBS Report (with Markups)

HTRW RA WBS		Marked Up Costs
331	HTRW REMEDIAL ACTION (CONSTRUCTION)	
331.02	MONITORING, SAMPLING, TESTING, AND ANALYSIS	
331.02.04	Monitoring Wells	Groundwater Monitoring Well \$42,587
331.02.91	Other	MONITORING \$59,995
		<hr/> \$102,582
		Total: \$102,582
		<hr/>
		HTRW RA WBS Total: \$102,582

Phase:

Phase Type: Remedial Action
Phase Name: Soil Exc & Disp-RA (HAZ)
Description: Assume 2 upland soil hot spots requiring excavation and offsite disposal:
 Hot Spot 1 near sample location SP03. Assume 25'x25' to 10' bgs.
 Hot Spot 2 near sample location MP03. Assume 25'x25' to 15' bgs.
 Resulting total excavation volume = approx. 600 cubic yards (average depth 12.5' bgs).
 Assume soil type: sand/gravelly sand mixture.
 Assume offsite disposal as hazardous waste at Arlington.

Approach: Ex Situ
Start Date: August, 2009
Labor Rate Group: Marked Up Labor Rates_E&E
Analysis Rate Group: System Analysis Rate
Phase Markups: Markups_E&E

Technology Markups

	<u>Markup</u>	<u>% Prime</u>	<u>% Sub.</u>
Excavation	Yes	100	0
Decontamination Facilities	Yes	100	0
Residual Waste Management	Yes	100	0
Professional Labor Management	Yes	100	0

Site WBS Report (with Markups)

HTRW RA WBS		Marked Up Costs
331	HTRW REMEDIAL ACTION (CONSTRUCTION)	
331.01	MOBILIZATION AND PREPARATORY WORK	
331.01.04	Setup/Construct Temporary Facilities	Decontamination Facilities \$3,608
		<hr/> \$3,608
331.08	SOLIDS COLLECTION AND CONTAINMENT	
331.08.01	Contaminated Soil Collection	Excavation \$19,268
		<hr/> \$19,268
331.19	DISPOSAL (COMMERCIAL)	
331.19.21	Transportation to Storage/Disposal Facility	Residual Waste Management \$143,911
		<hr/> \$143,911
331.22	GENERAL REQUIREMENTS (Optional Breakout)	
331.22.03	Warehouse, Materials Handling, and Purchasing	Professional Labor Management \$16,679
		<hr/> \$16,679
		Total: \$183,466
		<hr/>
		HTRW RA WBS Total: \$183,466
		<hr/>
		Total: \$286,048

Site WBS Report (with Markups)

System:

RACER Version: 10.0.2
Database Location: R:\RACER Cost Estimates\RACER Cost Estimates.mdb

Folder:

Folder Name: Washington

Region:

Region ID: NA
Region Name: Bremerton Gasworks
Region Category: Northwest

Location

State / Country: WASHINGTON
City: WASHINGTON STATE AVERAGE

<u>Location Modifier</u>	<u>Default</u>	<u>User</u>
	1.021	1.021

Options

Database: Modified System
Cost Database Date: 2008
Report Option: Calendar

Description Cost estimates for Bremerton Gasworks

Site WBS Report (with Markups)

Site:

Site ID: NA

Site Name: Option 2 - Hot Spot Excavation; GW Pump and Treat

Site Type: Multi - Soil & GW

Media/Waste Type

Primary: Soil

Secondary: Groundwater

Contaminant

Primary: Fuels

Secondary: None

Phase Names

Pre-Study: ☐

Study: ☐

Design: ☐

Removal/Interim Action: ☐

Remedial Action: ☒

Operations & Maintenance: ☒

Long Term Monitoring: ☒

Site Closeout: ☐

Documentation

Description: Cost estimate for Option 2 - Hot Spot Soil Excavation; GW Pump and Treat.

Assume 2 upland soil hot spots requiring excavation and offsite disposal:

Hot Spot 1 near sample location SP03. Assume 25'x25' to 10' bgs.

Hot Spot 2 near sample location MP03. Assume 25'x25' to 15' bgs.

Resulting total excavation volume = approx. 600 cubic yards (average depth 12.5' bgs).

Assume soil type: sand/gravelly sand mixture.

Assume offsite disposal as hazardous waste.

Assume GW plume of approx. 150'x350'. Use pump and treat for 5 years with monitoring.

Assume average GW depth: 25' bgs.

Assume installation of 4 monitoring wells.

Support Team: E&E

References: R.S. Means, 2008, Heavy Construction Cost Data 22nd Annual Edition (HCCD)

Estimator Information

Estimator Name: Vanessa Rayner

Estimator Title: Civil Engineer

Agency/Org./Office: Ecology & Environment, Inc.

Business Address: 720 Third Ave., Suite 1700
Seattle, WA 98104

Site WBS Report (with Markups)

Telephone Number: 206-624-9537
Email Address: vrayner@ene.com
Estimate Prepared Date: 05/15/2009

Estimator Signature: _____

Vanessa Rayner

Date: _____

05/20/09

Reviewer Information

Reviewer Name: Steve Siefert
Reviewer Title: Senior Chemical Engineer
Agency/Org./Office: Ecology & Environment, Inc.
Business Address: 720 Third Ave., Suite 1700
Seattle, WA 98104
Telephone Number: 206-624-9537
Email Address: ssiefert@ene.com
Date Reviewed: 05/15/2009

Reviewer Signature: _____

Steve Siefert

Date: _____

5-20-09

Site WBS Report (with Markups)

Phase:

Phase Type: Remedial Action
Phase Name: Monitoring Well Installation
Description: Assume 4 monitoring wells. 2" diameter PVC Schedule 80 .
Assume average GW depth: 25' bgs.
Assume well depth of 45'.
Assume split spoon sample collection every 5' with analysis (fuels).
Costs only for well installation. Longterm monitoring not included.

Approach: None
Start Date: August, 2009
Labor Rate Group: Marked Up Labor Rates_E&E
Analysis Rate Group: System Analysis Rate
Phase Markups: Markups_E&E

Technology Markups

Groundwater Monitoring Well

<u>Markup</u>	<u>% Prime</u>	<u>% Sub.</u>
Yes	100	0

Site WBS Report (with Markups)

HTRW RA WBS		Marked Up Costs
331	HTRW REMEDIAL ACTION (CONSTRUCTION)	
331.02	MONITORING, SAMPLING, TESTING, AND ANALYSIS	
331.02.04	Monitoring Wells	Groundwater Monitoring Well
		\$42,587
		<hr/>
		\$42,587
		<hr/>
		Total: \$42,587
		<hr/>
	HTRW RA WBS Total:	\$42,587

Phase:

Phase Type: Remedial Action
Phase Name: Pump & Treat Remedial Action
Description: Cost of installation and startup of a pump and treat operation (doesn't include O&M).
 Use filtration and carbon absorption (2 vessels in series) with treated water discharge to POTW.
 Assume GW plume of approx. 150'x350'.
 Assume average GW depth: 25' bgs.
 Assume base of contamination at 45' bgs.
 Assume sand/gravelly sand mixture.

Approach: Ex Situ
Start Date: August, 2009
Labor Rate Group: Marked Up Labor Rates_E&E
Analysis Rate Group: System Analysis Rate
Phase Markups: Markups_E&E

Technology Markups

	<u>Markup</u>	<u>% Prime</u>	<u>% Sub.</u>
Groundwater Extraction Wells	Yes	100	0
Media Filtration	Yes	100	0
Carbon Adsorption (Liquid)	Yes	100	0
Discharge to POTW	Yes	100	0
Overhead Electrical Distribution	Yes	100	0
Professional Labor Management	Yes	100	0
Residual Waste Management	Yes	100	0

Site WBS Report (with Markups)

HTRW RA WBS		Marked Up Costs
331	HTRW REMEDIAL ACTION (CONSTRUCTION)	
331.03	SITWORK	
331.03.06	Electrical Distribution	Overhead Electrical Distribution \$23,579
		<hr/> \$23,579
331.06	GROUNDWATER COLLECTION AND CONTROL	
331.06.01	Extraction and Injection Wells	Groundwater Extraction Wells \$38,841
		<hr/> \$38,841
331.13	PHYSICAL TREATMENT	
331.13.20	Carbon Adsorption - Liquids	Carbon Adsorption (Liquid) \$5,352
331.13.01	Filtration/Ultrafiltration	Media Filtration \$32,098
		<hr/> \$37,451
331.19	DISPOSAL (COMMERCIAL)	
331.19.22	Disposal Fees and Taxes	Discharge to POTW \$21,293
331.19.21	Transportation to Storage/Disposal Facility	Residual Waste Management \$6,308
		<hr/> \$27,602
331.22	GENERAL REQUIREMENTS (Optional Breakout)	
331.22.03	Warehouse, Materials Handling, and Purchasing	Professional Labor Management \$21,332
		<hr/> \$21,332
		<hr/> Total: \$148,804
	HTRW RA WBS Total:	\$148,804

Site WBS Report (with Markups)

Phase:

Phase Type: Remedial Action
Phase Name: Soil Exc & Disp-RA (HAZ)
Description: Assume 2 upland soil hot spots requiring excavation and offsite disposal:
Hot Spot 1 near sample location SP03. Assume 25'x25' to 10' bgs.
Hot Spot 2 near sample location MP03. Assume 25'x25' to 15' bgs.
Resulting total excavation volume = approx. 600 cubic yards (average depth 12.5' bgs).
Assume soil type: sand/gravelly sand mixture.
Assume offsite disposal as hazardous waste at Arlington.

Approach: Ex Situ
Start Date: August, 2009
Labor Rate Group: Marked Up Labor Rates_E&E
Analysis Rate Group: System Analysis Rate
Phase Markups: Markups_E&E

Technology Markups

	<u>Markup</u>	<u>% Prime</u>	<u>% Sub.</u>
Excavation	Yes	100	0
Decontamination Facilities	Yes	100	0
Residual Waste Management	Yes	100	0
Professional Labor Management	Yes	100	0

Site WBS Report (with Markups)

HTRW RA WBS		Marked Up Costs
331	HTRW REMEDIAL ACTION (CONSTRUCTION)	
331.01	MOBILIZATION AND PREPARATORY WORK	
331.01.04	Setup/Construct Temporary Facilities	Decontamination Facilities \$3,608
		<hr/> \$3,608
331.08	SOLIDS COLLECTION AND CONTAINMENT	
331.08.01	Contaminated Soil Collection	Excavation \$19,268
		<hr/> \$19,268
331.19	DISPOSAL (COMMERCIAL)	
331.19.21	Transportation to Storage/Disposal Facility	Residual Waste Management \$143,911
		<hr/> \$143,911
331.22	GENERAL REQUIREMENTS (Optional Breakout)	
331.22.03	Warehouse, Materials Handling, and Purchasing	Professional Labor Management \$16,679
		<hr/> \$16,679
		Total: \$183,466
	HTRW RA WBS Total:	\$183,466

Site WBS Report (with Markups)

Phase:

Phase Type: Operations & Maintenance
Phase Name: O&M - Pump & Treat System
Description: Assumes O&M for 5 years (60 months).

Start Date: August, 2009
Labor Rate Group: Marked Up Labor Rates_E&E
Analysis Rate Group: System Analysis Rate
Phase Markups: Markups_E&E

Technology Markups

Operations and Maintenance

<u>Markup</u>	<u>% Prime</u>	<u>% Sub.</u>
Yes	100	0

Site WBS Report (with Markups)

HTRW OM WBS		Marked Up Costs
342	HTRW OPERATION AND MAINTENANCE (POST CONSTRUCTION)	
342.22	GENERAL REQUIREMENTS (Optional Breakout)	
342.22.91	Other	Miscellaneous Support Costs
		\$213,917
		<hr/>
		\$213,917
		<hr/>
		Total: \$213,917
		<hr/>
	HTRW OM WBS Total:	\$213,917

Phase:

Phase Type: Long Term Monitoring
Phase Name: Monitoring - Pump & Treat System
Description: Pump & Treat Monitoring plus residual waste management.
 Assumes monitoring for 5 years.
 Sampled quarterly.
 Costs are for monitoring of P&T system extraction wells (2 wells) plus GW monitoring wells (4 wells) - total of 6 wells.

Start Date: August, 2009
Labor Rate Group: Marked Up Labor Rates_E&E
Analysis Rate Group: System Analysis Rate
Phase Markups: Markups_E&E

Technology Markups

	<u>Markup</u>	<u>% Prime</u>	<u>% Sub.</u>
MONITORING- P&T	Yes	100	0
Residual Waste Management	Yes	100	0

Site WBS Report (with Markups)

HTRW RA WBS		Marked Up Costs
331	HTRW REMEDIAL ACTION (CONSTRUCTION)	
331.02	MONITORING, SAMPLING, TESTING, AND ANALYSIS	
331.02.91	Other	MONITORING- P&T
		\$227,614
		\$227,614
331.19	DISPOSAL (COMMERCIAL)	
331.19.21	Transportation to Storage/Disposal Facility	Residual Waste Management
		\$4,947
		\$4,947
		Total: \$232,560
		HTRW RA WBS Total: \$232,560
		Total: \$821,334

Site WBS Report (with Markups)

System:

RACER Version: 10.0.2

Database Location: R:\RACER Cost Estimates\RACER Cost Estimates.mdb

Folder:

Folder Name: Washington

Region:

Region ID: NA

Region Name: Bremerton Gasworks

Region Category: Northwest

Location

State / Country: WASHINGTON

City: WASHINGTON STATE AVERAGE

Location Modifier**Default****User**

1.021

1.021

Options

Database: Modified System

Cost Database Date: 2008

Report Option: Calendar

Description

Cost estimates for Bremerton Gasworks

Site WBS Report (with Markups)

Site:

Site ID: NA
Site Name: Option 3 - Ex; BW; Cap; GW P&T; Sed Dredge
Site Type: Multi - Soil, GW, & Sediment

Media/Waste Type

Primary: Soil
Secondary: Groundwater

Contaminant

Primary: Fuels
Secondary: None

Phase Names

Pre-Study: ☐
Study: ☐
Design: ☐
Removal/Interim Action: ☐
Remedial Action: ☒
Operations & Maintenance: ☒
Long Term Monitoring: ☒
Site Closeout: ☐

Documentation

Description: Cost estimate for Option 3 - Hot Spot Soil Excavation; Barrier Wall; Upland Cap; GW Pump and Treat; and Sediment Dredging.

Assume 2 upland soil hot spots requiring excavation and offsite disposal:
Hot Spot 1 near sample location SP03. Assume 25'x25' to 10' bgs.
Hot Spot 2 near sample location MP03. Assume 25'x25' to 15' bgs.
Resulting total excavation volume = approx. 600 cubic yards (average depth 12.5' bgs).
Assume soil type: sand/gravelly sand mixture.
Assume offsite disposal as hazardous waste.

Assume soil bentonite barrier wall (i.e., slurry wall) around GW plume.
Dimensions: 1000' long x 60' deep.

Assume upland cap within BW footprint (350'x150') to minimize infiltration. Use HDPE geomembrane with drainage/protection layer overlain with asphalt surface layer.

Assume GW plume of approx. 150'x350'. Use pump and treat for 5 years with monitoring.

Assume average GW depth: 25' bgs.
Assume installation of 4 monitoring wells.

Assume water-based dredging of contaminated sediments with off-site disposal.
Assume dredge area 50' x 350' x 4' deep or approx. 2600 cubic yards. Assume non-haz disposal.

Site WBS Report (with Markups)

Support Team: E&E

References: R.S. Means, 2008, Heavy Construction Cost Data 22nd Annual Edition (HCCD)

Estimator Information

Estimator Name: Vanessa Rayner

Estimator Title: Civil Engineer

Agency/Org./Office: Ecology & Environment, Inc.

Business Address: 720 Third Ave., Suite 1700
Seattle, WA 98104

Telephone Number: 206-624-9537

Email Address: vrayner@ene.com

Estimate Prepared Date: 05/15/2009

Estimator Signature: Vanessa Rayner

Date: 05/20/09

Reviewer Information

Reviewer Name: Steve Siefert

Reviewer Title: Senior Chemical Engineer

Agency/Org./Office: Ecology & Environment, Inc.

Business Address: 720 Third Ave., Suite 1700
Seattle, WA 98104

Telephone Number: 206-624-9537

Email Address: ssiefert@ene.com

Date Reviewed: 05/15/2009

Reviewer Signature: Steve Siefert

Date: 5-20-09

Site WBS Report (with Markups)

Phase:

Phase Type: Remedial Action
Phase Name: Monitoring Well Installation
Description: Assume 4 monitoring wells. 2" diameter PVC Schedule 80 .
Assume average GW depth: 25' bgs.
Assume well depth of 45'.
Assume split spoon sample collection every 5' with analysis (fuels).
Costs only for well installation. Longterm monitoring not included.
Approach: None
Start Date: August, 2009
Labor Rate Group: Marked Up Labor Rates_E&E
Analysis Rate Group: System Analysis Rate
Phase Markups: Markups_E&E

Technology Markups

Groundwater Monitoring Well

<u>Markup</u>	<u>% Prime</u>	<u>% Sub.</u>
Yes	100	0

Site WBS Report (with Markups)

HTRW RA WBS		Marked Up Costs
331	HTRW REMEDIAL ACTION (CONSTRUCTION)	
331.02	MONITORING, SAMPLING, TESTING, AND ANALYSIS	
331.02.04	Monitoring Wells	Groundwater Monitoring Well
		\$42,587
		<hr/>
		\$42,587
		<hr/>
		Total: \$42,587
		<hr/>
	HTRW RA WBS Total:	\$42,587

Phase:

Phase Type: Remedial Action
Phase Name: Pump & Treat Remedial Action
Description: Cost of installation and startup of a pump and treat operation (doesn't include O&M).
 Use filtration and carbon absorption (2 vessels in series) with treated water discharge to POTW.
 Assume GW plume of approx. 150'x350'.
 Assume average GW depth: 25' bgs.
 Assume base of contamination at 45' bgs.
 Assume sand/gravelly sand mixture.

Approach: Ex Situ
Start Date: August, 2009
Labor Rate Group: Marked Up Labor Rates_E&E
Analysis Rate Group: System Analysis Rate
Phase Markups: Markups_E&E

Technology Markups

	<u>Markup</u>	<u>% Prime</u>	<u>% Sub.</u>
Groundwater Extraction Wells	Yes	100	0
Media Filtration	Yes	100	0
Carbon Adsorption (Liquid)	Yes	100	0
Discharge to POTW	Yes	100	0
Overhead Electrical Distribution	Yes	100	0
Professional Labor Management	Yes	100	0
Residual Waste Management	Yes	100	0

Site WBS Report (with Markups)

HTRW RA WBS		Marked Up Costs
331	HTRW REMEDIAL ACTION (CONSTRUCTION)	
331.03	SITWORK	
331.03.06	Electrical Distribution	Overhead Electrical Distribution \$23,579
		<hr/> \$23,579
331.06	GROUNDWATER COLLECTION AND CONTROL	
331.06.01	Extraction and Injection Wells	Groundwater Extraction Wells \$38,841
		<hr/> \$38,841
331.13	PHYSICAL TREATMENT	
331.13.20	Carbon Adsorption - Liquids	Carbon Adsorption (Liquid) \$5,352
331.13.01	Filtration/Ultrafiltration	Media Filtration \$32,098
		<hr/> \$37,451
331.19	DISPOSAL (COMMERCIAL)	
331.19.22	Disposal Fees and Taxes	Discharge to POTW \$21,293
331.19.21	Transportation to Storage/Disposal Facility	Residual Waste Management \$6,308
		<hr/> \$27,602
331.22	GENERAL REQUIREMENTS (Optional Breakout)	
331.22.03	Warehouse, Materials Handling, and Purchasing	Professional Labor Management \$21,332
		<hr/> \$21,332
		<hr/> Total: \$148,804
	HTRW RA WBS Total:	\$148,804

Site WBS Report (with Markups)

Phase:

Phase Type: Remedial Action
Phase Name: Sediment Dredging-RA_Water-Based
Description: Costs for RA for nearshore sediment dredging using water-based equipment. Includes bathymetric surveying (pre and post construction), sediment BMPs (e.g., booms, silt curtains, etc.), and sediment dewatering. Does not include costs for study, design, O&M, monitoring, or closeout. Assume dredge area 50' x 350' x 4' deep or approx. 2600 cubic yards. Offsite disposal costs included in separate phase(s).
Approach: Ex Situ
Start Date: August, 2009
Labor Rate Group: Marked Up Labor Rates_E&E
Analysis Rate Group: System Analysis Rate
Phase Markups: Markups_E&E

Technology Markups

	<u>Markup</u>	<u>% Prime</u>	<u>% Sub.</u>
USER DEF_SED DREDGING_WATER-BASED	Yes	100	0
USER DEF_BATHY SURVEY_PRE-CONSTRUCTION	Yes	100	0
USER DEF_BATHY SURVEY_POST-CONSTRUCTION	Yes	100	0
USER DEF_PROFESSIONAL LABOR MANAGEMENT	Yes	100	0
USER DEF_SEDIMENT BMPs	Yes	100	0
USER DEF_SEDIMENT DEWATERING	Yes	100	0

Site WBS Report (with Markups)

HTRW RA WBS		Marked Up Costs
331	HTRW REMEDIAL ACTION (CONSTRUCTION)	
331.02	MONITORING, SAMPLING, TESTING, AND ANALYSIS	
331.02.90	Other	USER DEF_PROFESSIONAL LABOR MANAGEMENT
		\$21,577
		<hr/>
		\$21,577
331.03	SITWORK	
331.03.90	Other	USER DEF_SEDIMENT BMPS
		\$27,600
	Other	USER DEF_SEDIMENT DEWATERING
		\$40,365
		<hr/>
		\$67,965
331.09	LIQUIDS/SEDIMENTS/SLUDGES COLLECTION AND CONTAINMENT	
331.09.01	Dredging/Excavating	USER DEF_SED DREDGING_WATER-BA SED
		\$340,584
		<hr/>
		\$340,584
331.22	GENERAL REQUIREMENTS (Optional Breakout)	
331.22.04	Engineering, Surveying, and Quality Control	USER DEF_BATHY SURVEY_POST-CONST RUCTION
		\$11,500
	Engineering, Surveying, and Quality Control	USER DEF_BATHY SURVEY_PRE-CONSTR UCTION
		\$11,500
		<hr/>
		\$23,000
		<hr/>
	Total:	\$453,126
	HTRW RA WBS Total:	\$453,126

Site WBS Report (with Markups)

Phase:

Phase Type: Remedial Action
Phase Name: Sediment Off-Site Trans & Disposal-RA (NON-HAZ)
Description: Disposal costs for offsite transportation and disposal of dredged sediment (following dewatering/solidification) at non-haz facility.
2600 cubic yards.

Approach: Ex Situ
Start Date: August, 2009
Labor Rate Group: Marked Up Labor Rates_E&E
Analysis Rate Group: System Analysis Rate
Phase Markups: Markups_E&E

Technology Markups

	<u>Markup</u>	<u>% Prime</u>	<u>% Sub.</u>
Off-site Transportation and Waste Disposal	Yes	100	0
Professional Labor Management	Yes	100	0

Site WBS Report (with Markups)

HTRW RA WBS		Marked Up Costs
331	HTRW REMEDIAL ACTION (CONSTRUCTION)	
331.19	DISPOSAL (COMMERCIAL)	
331.19.22	Disposal Fees and Taxes	Off-site Transportation and Waste Disposal \$189,938
		<hr/> \$189,938
331.22	GENERAL REQUIREMENTS (Optional Breakout)	
331.22.03	Warehouse, Materials Handling, and Purchasing	Professional Labor Management \$3,799
		<hr/> \$3,799
		Total: \$193,737
HTRW RA WBS Total:		\$193,737

Phase:

Phase Type: Remedial Action
Phase Name: Slurry Wall
Description: Assume soil bentonite barrier wall (i.e., slurry wall) around GW plume. Dimensions: 1000' long x 60' deep with 12" protective gravel cover.
Approach: In Situ
Start Date: August, 2009
Labor Rate Group: Marked Up Labor Rates_E&E
Analysis Rate Group: System Analysis Rate
Phase Markups: Markups_E&E

Technology Markups

	<u>Markup</u>	<u>% Prime</u>	<u>% Sub.</u>
Slurry Walls	Yes	100	0
Professional Labor Management	Yes	100	0

Site WBS Report (with Markups)

HTRW RA WBS		Marked Up Costs
331	HTRW REMEDIAL ACTION (CONSTRUCTION)	
331.06	GROUNDWATER COLLECTION AND CONTROL	
331.06.03	Slurry Walls	Slurry Walls \$490,470
		<hr/> \$490,470
331.22	GENERAL REQUIREMENTS (Optional Breakout)	
331.22.03	Warehouse, Materials Handling, and Purchasing	Professional Labor Management \$49,047
		<hr/> \$49,047
		Total: \$539,517
HTRW RA WBS Total:		\$539,517

Phase:

Phase Type: Remedial Action

Phase Name: Soil Exc & Disp-RA (HAZ)

Description: Assume 2 upland soil hot spots requiring excavation and offsite disposal:
Hot Spot 1 near sample location SP03. Assume 25'x25' to 10' bgs.
Hot Spot 2 near sample location MP03. Assume 25'x25' to 15' bgs.
Resulting total excavation volume = approx. 600 cubic yards (average depth 12.5' bgs).
Assume soil type: sand/gravelly sand mixture.
Assume offsite disposal as hazardous waste at Arlington.

Approach: Ex Situ

Start Date: August, 2009

Labor Rate Group: Marked Up Labor Rates_E&E

Analysis Rate Group: System Analysis Rate

Phase Markups: Markups_E&E

Technology Markups

	<u>Markup</u>	<u>% Prime</u>	<u>% Sub.</u>
Residual Waste Management	Yes	100	0
Excavation	Yes	100	0
Decontamination Facilities	Yes	100	0
Professional Labor Management	Yes	100	0

Site WBS Report (with Markups)

HTRW RA WBS		Marked Up Costs
331	HTRW REMEDIAL ACTION (CONSTRUCTION)	
331.01	MOBILIZATION AND PREPARATORY WORK	
331.01.04	Setup/Construct Temporary Facilities	Decontamination Facilities \$3,608
		<hr/> \$3,608
331.08	SOLIDS COLLECTION AND CONTAINMENT	
331.08.01	Contaminated Soil Collection	Excavation \$19,268
		<hr/> \$19,268
331.19	DISPOSAL (COMMERCIAL)	
331.19.21	Transportation to Storage/Disposal Facility	Residual Waste Management \$143,911
		<hr/> \$143,911
331.22	GENERAL REQUIREMENTS (Optional Breakout)	
331.22.03	Warehouse, Materials Handling, and Purchasing	Professional Labor Management \$16,679
		<hr/> \$16,679
		<hr/> Total: \$183,466
	HTRW RA WBS Total:	\$183,466

Site WBS Report (with Markups)

Phase:

Phase Type: Remedial Action
Phase Name: Cap-RA
Description: Cap dimensions: 150' x 350'.
Use HDPE geomembrane with drainage/protection layer overlain with asphalt surface layer.
Include gas vents and perimeter security fence.
Approach: In Situ
Start Date: August, 2010
Labor Rate Group: Marked Up Labor Rates_E&E
Analysis Rate Group: System Analysis Rate
Phase Markups: Markups_E&E

Technology Markups

	<u>Markup</u>	<u>% Prime</u>	<u>% Sub.</u>
Capping	Yes	100	0
Fencing	Yes	100	0
Professional Labor Management	Yes	100	0

Site WBS Report (with Markups)

HTRW RA WBS		Marked Up Costs
331	HTRW REMEDIAL ACTION (CONSTRUCTION)	
331.03	SITEWORK	
331.03.05	Fencing	Fencing \$49,939
		<hr/> \$49,939
331.08	SOLIDS COLLECTION AND CONTAINMENT	
331.08.05	Capping of Contaminated Area/Waste Pile (Soil/Asphalt Cap)	Capping \$329,087
		<hr/> \$329,087
331.22	GENERAL REQUIREMENTS (Optional Breakout)	
331.22.03	Warehouse, Materials Handling, and Purchasing	Professional Labor Management \$32,909
		<hr/> \$32,909
		Total: \$411,935
		<hr/> HTRW RA WBS Total: \$411,935

Phase:

Phase Type: Operations & Maintenance
Phase Name: O&M - Pump & Treat System
Description: Assumes O&M for 5 years (60 months).

Start Date: August, 2009
Labor Rate Group: Marked Up Labor Rates_E&E
Analysis Rate Group: System Analysis Rate
Phase Markups: Markups_E&E

Technology Markups

Operations and Maintenance

<u>Markup</u>	<u>% Prime</u>	<u>% Sub.</u>
Yes	100	0

Site WBS Report (with Markups)

HTRW OM WBS		Marked Up Costs
342	HTRW OPERATION AND MAINTENANCE (POST CONSTRUCTION)	
342.22	GENERAL REQUIREMENTS (Optional Breakout)	
342.22.91	Other	Miscellaneous Support Costs
		\$213,917
		<hr/>
		\$213,917
		<hr/>
		Total: \$213,917
		<hr/>
	HTRW OM WBS Total:	\$213,917

Phase:

Phase Type: Long Term Monitoring
Phase Name: Monitoring - Pump & Treat System
Description: Pump & Treat Monitoring plus residual waste management.
 Assumes monitoring for 5 years.
 Sampled quarterly.
 Costs are for monitoring of P&T system extraction wells (2 wells) plus GW monitoring wells (4 wells) - total of 6 wells.

Start Date: August, 2009
Labor Rate Group: Marked Up Labor Rates_E&E
Analysis Rate Group: System Analysis Rate
Phase Markups: Markups_E&E

Technology Markups

MONITORING- P&T
 Residual Waste Management

<u>Markup</u>	<u>% Prime</u>	<u>% Sub.</u>
Yes	100	0
Yes	100	0

Site WBS Report (with Markups)

HTRW RA WBS		Marked Up Costs
331	HTRW REMEDIAL ACTION (CONSTRUCTION)	
331.02	MONITORING, SAMPLING, TESTING, AND ANALYSIS	
331.02.91	Other	MONITORING- P&T
		\$227,614
		\$227,614
331.19	DISPOSAL (COMMERCIAL)	
331.19.21	Transportation to Storage/Disposal Facility	Residual Waste Management
		\$4,947
		\$4,947
		Total: \$232,560
		HTRW RA WBS Total: \$232,560
		Total: \$2,419,649